

Remarks

Applicants have: (a) amended claims 1, 5, 7-14, and 16-17; (b) added claim 18; and (c) canceled claim 6 to more clearly define the present invention. Further, Applicants have amended the Title of the Invention in response to the Examiner's requirement. Lastly, Applicants have: (a) submitted an amendment to the drawings and added new FIG. 5A for the Examiner's approval and (b) amended the specification to take into account new FIG. 5A. No new matter has been added.

Examiner stated:

The reference lined through in the Information Disclosure Statement [Volk Double Aspheric Bio Lenses Instruction Manual] has not been considered because the lined through reference does not contain a date of publication.

Applicants respectfully submit that they admit that the reference is prior art and, as such, Applicants respectfully request the Examiner to consider this reference.

Examiner objected to the drawings. Specifically, the Examiner stated:

The drawings are objected to under 37 C.F.R. § 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the linear polarizing means of claims 10-11 and the fixation target of claims 12-14 must be shown or the feature canceled from the claim. No new matter should be entered.

The drawings are objected to as failing to comply with 37 C.F.R. § 1.84(f) which states, "The same character must never be used to designate different parts." However, "402" has been used to designate both a beamsplitter and a mirror in figure 6. Correction is required.

Applicants submit new FIG. 5A and amended FIG. 6 for the Examiner's approval.

New FIG. 5A is the same as original FIG. 5 with the following additions. FIG. 5A shows cross polarizers, one in the illumination path and the other one in the observation path of the fundus camera; see the specification at p. 13, lines 6-13. Further, new FIG. 5A shows a first internal fixation target is developed by placing a needle into the intermediate image of the fundus. In particular, as shown in new FIG. 5A, a needle is placed in the illumination path

between physical stop 161 and source 150; see the specification at p. 14, lines 6-14. Still further, new FIG. 5A shows a visible light source, such as a visible LED is located in the image plane of a video port of the fundus camera by fixing the light source to a plate which is manually movable in the x- and y- directions in a mount located at an image plane conjugate to CCD target 140. As shown in new FIG. 5A, the light source is coupled into the fundus camera between tube lens 130 and internal focusing lens 120 by a beamsplitter, see the specification at p. 14, lines 16-24.

The amendment to FIG. 6 makes clear that the rotating glass plate is labeled as 403. Unfortunately, the labeling of the rotating glass plate as "403" in the originally filed informal drawings was unclear and the number "402" was not used to designate different parts.

No new matter has been added as the linear polarizing means of claims 10-11 and the fixation targets of claims 12-14 appear in the specification and the original claims, original claims are considered to be a part of the originally filed specification. As such, Applicants respectfully request the Examiner to withdraw the objection to the drawings.

Examiner stated:

The title of the invention is not sufficiently descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Applicants have amended the title of the invention in accordance with the Examiner's requirement. As such, Applicants respectfully submit that the present title of the invention is clearly indicative of the inventions to which the claims are directed.

Examiner objected to claims 1-14 and 16-17. Specifically, the Examiner stated:

Claims 1-14 and 16-17 are objected to because of the following informalities: the term "the fundus by the eye" should be the fundus of the eye. Appropriate correction is required.

Applicants have amended claims 1, 5, and 16-17 in response to the Examiner's objection. As such, Applicants respectfully request the Examiner to withdraw this objection.

Examiner rejected claims 1-17 under 35 U.S.C. § 112, second paragraph.
Specifically, the Examiner stated:

Claims 1-17 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 16-17 the term “a scanned sample beam of radiation” is indefinite because a beam of radiation cannot be scanned. The term “which apparatus comprises” is confusing. The term “a lens means which is fixed with respect to the beam scanner” is indefinite because it is not clear how the lens and beam scanner are fixed, i.e., the distance or angle could be fixed.

In claim 5 the term “a scanned sample beam of radiation” is indefinite because a beam of radiation cannot be scanned. The term “which apparatus comprises” is confusing. The term “the means for transferring is fixed with respect to the beam scanner and at least a first portion of the focusing means” is indefinite because it is not clear how the lens and beam scanner are fixed, i.e., the distance or angle could be fixed.

Claims 2 and 6 are indefinite because they fail to cite the necessary limitations needed to make clear the interrelation between the means for focusing and the fundus camera and the ocular (or the internal lens).

Claims 8 and 9 are indefinite because they fail to cite the necessary limitations needed to make clear the interrelation between the light stop means and the illumination path.

Claims 10 and 11 are indefinite because they fail to cite the necessary limitations needed to make clear the interrelation between the linear polarizing means and the observing path and the illumination path. The term “the illumination means” lacks proper antecedent basis.

In claim 12 the term “the ocular lens” lacks proper antecedent basis.

The interrelation of the limitation of claim 14 and the apparatus is not clear.

Applicants have amended claims 1-5, 7-14, and 16-17 and canceled claim 6 in response to the Examiner’s rejection.

Claims 1 and 16-17: First, Applicants have amended claim 1 to replace the term “scanned sample beam of radiation.” However, Applicants respectfully disagree with the

Examiner and assert that a beam of radiation can be scanned. For example, in the simplest case, a beam of radiation from a light source can be scanned by causing it to impinge upon a rotating mirror. Second, Applicants have amended claim 1 so that the term "which apparatus comprises" now reads --the apparatus comprises--; Applicants have amended claim 16 so that the term "which method comprises comprises" now reads --the method comprises--; and Applicants have amended claim 17 so that the term "which apparatus comprises now reads --the method comprises the steps of--. Lastly, Applicants respectfully submit that the term "a lens means which is fixed with respect to the beam scanner" is not indefinite because the claim specifies what is meant by fixed. In particular, the term fixed is defined as follows "fixed ... so that the point of final deflection is located substantially in the back focal plane of the lens means." Further, this is not indefinite because the meaning of this term is clearly shown in FIG. 3 and explained in the specification at p. 10, lines 5-14 as follows:

In accordance with the present invention: (a) the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of scanner lens 215 which is mounted on movable stage 213 and (b) beam scanner 210 is rigidly connected to the movable stage of scanner lens 215 to ensure that the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of scanner lens 215 for substantially all focusing positions of scanner lens 215. As a result, the ray pencil is collimated by scanner lens 215.

Claim 5: First, Applicants have amended claim 1 to replace the term "scanned sample beam of radiation." However, Applicants respectfully disagree with the Examiner and assert that a beam of radiation can be scanned. For example, in the simplest case, a beam of radiation from a light source can be scanned by causing it to impinge upon a rotating mirror. Second, Applicants have amended claim 5 so that the term "which apparatus comprises" now reads --the apparatus comprises--. Lastly, Applicants respectfully submit that the term "a lens means which is fixed with respect to the beam scanner" is not indefinite because the claim specifies what is meant by fixed. In particular, the term fixed is defined as follows "fixed ... so that the point of final deflection is located substantially in the back focal plane of the lens means." Further, this is not indefinite because the meaning of this term is clearly shown in FIG. 5 and explained in the specification at p. 12, lines 8-20 as follows:

In accordance with the present invention: (a) the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of internal focusing lens 120 and (b) mounting 281 for beamsplitter 290 and mounting 287 for beam scanner 210

are rigidly connected to internal focusing lens 120 so that they all move together. This ensures that the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of internal focusing lens 120 for substantially all focusing positions of internal focusing lens 120. As a result, the ray pencil is collimated by internal focusing lens 120 and is focused by relay lens 110 into the plane of geometrical beamsplitter 170.

Claims 2 and 6: Applicants have amended claim 2 and canceled claim 6 to clearly set forth the interrelation between the means for focusing and the fundus camera, i.e., the apparatus further includes a fundus camera which includes an ocular lens. Further, the fundus camera includes means for directing the transferred radiation to impinge upon the ocular lens.

Claims 8-9: Applicants have amended claims 8 and 9 to provide the interrelation between the light stop means and the illumination path.

Claims 10-11: Applicants have amended claims 10 and 11 to provide the interrelation between the linear polarizing means and the observing and illumination paths.

Claim 12: Applicants have amended claim 12 to provide antecedent basis for the ocular lens.

Claim 14: Applicants have amended claim 14 to provide the interrelation between the limitation and the apparatus.

As such, Applicants respectfully submit that present claims 1-17 meet the requirements of 35 U.S.C. § 112, second paragraph and Applicants respectfully request the Examiner to withdraw this rejection.

Examiner rejected claims 1-3, 5-7 and 16-17 under 35 U.S.C. § 102(b).
Specifically, the Examiner stated:

Claims 1-3, 5-7 and 16-17 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Klingbeil et al. (39 26 652).

Klingbeil et al. discloses an apparatus comprising:

- a. a scanning sample beam of radiation;
- b. beamsplitter for transferring the sample beam (13);
- c. a focusing means (1) which is fixed with respect to the beam scanner, i.e., rotatable lens 1 stays in the same plane, therefore the lens and the mirror of the scanner (which does not have a reference number) are fixed, also the first portion is 1 and 2 where 1 is fixed and 2 is movable; and
- d. an ocular lens of a fundus camera (2).

Applicants have amended claims 1-3, 5, 7, and 16-17 and canceled claim 6 to more clearly define the present invention. As such, Applicants respectfully traverse the rejection.

Applicants respectfully submit that present claims 1-3, 5, 7 and 16 all require a means for transferring radiation output from a scanner which comprises a lens means which is fixed with respect to a beam scanner so that the point of final deflection is located substantially in the back focal plane of the lens means and wherein the lens means is movable. Present claims 5 and 7 require the lens means to be an internal focusing lens means of a fundus camera. Further, present claim 17 requires transferring with a beamsplitter which is fixed with respect to the beam scanner and a movable focusing lens so that the point of final deflection is located substantially in the back focal plane of the focusing lens. The result achieved by these limitations was described as follows in the specification at p. 10, lines 4-25 for embodiments of the present invention which are fabricated in accordance with claims 1-3 and 16:

In accordance with the present invention: (a) the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of scanner lens 215 which is mounted on movable stage 213 and (b) beam scanner 210 is rigidly connected to the movable stage of scanner lens 215 to ensure that the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of scanner lens 215 for substantially all focusing positions of scanner lens 215. As a result, the ray pencil is collimated by scanner lens 215. Then, the collimated light impinges upon beamsplitter 220 and beamsplitter 220 directs it to ocular lens 100. Ocular lens 100 is positioned so that collimated light impinging thereon is focused into eye pupil 1020. Finally, the sample beam is focused by the optics of eye 1000 onto fundus 1010. Thus, in accordance with the present invention, the point of final deflection of beam scanner 210 is imaged into eye pupil 1020 for all focusing positions because of the collimated space between ocular lens 100 and scanner lens 215. If this were not the case, then vignetting would occur whereby scanning of sample beam 200 would be limited by eye pupil 1020.

The result achieved by these limitations was described as follows in the specification at p. 12, line 8 to p. 13, line 2 for embodiments of the present invention which are fabricated in accordance with claims 5, 7 and 17:

In accordance with the present invention: (a) the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of internal focusing lens 120 and (b) mounting

281 for beamsplitter 290 and mounting 287 for beam scanner 210 are rigidly connected to internal focusing lens 120 so that they all move together. This ensures that the point of final deflection of beam scanner 210 is disposed substantially in the back focal plane of internal focusing lens 120 for substantially all focusing positions of internal focusing lens 120. As a result, the ray pencil is collimated by internal focusing lens 120 and is focused by relay lens 110 into the plane of geometrical beamsplitter 170. Then, ocular lens 100 focuses the ray pencil into eye pupil 1020. Thus, collimated sample beam 200 is focused by internal focusing lens 120 in intermediate image plane 111 which is conjugate with CCD target 140. Relay lens 110 images intermediate image plane 111 into intermediate image plane 113 which is equal to the back focal plane of ocular lens 100 in the case of an emetropic eye. Then, ocular lens 100 and the optics of eye 1000 focus the sample beam onto fundus 1010. Since mounting 281 for beamsplitter 290 and mounting 287 for beam scanner 210 are rigidly connected to internal focusing lens 120 so that they all move together, the point of final deflection of beam scanner 210 is always imaged into the plane of geometrical beamsplitter 170, independent of the position of internal focusing lens 120. Hence, the scanning sample beam is not vignetted by the aperture stop of geometrical beamsplitter 170.

As the Examiner can appreciate from the above, and as is shown in FIGs. 3 and 5, the output from the lens means is collimated radiation which is then focused onto the fundus without vignetting. Applicants respectfully submit that there is no disclosure, teaching, hint or suggestion of any kind in Klingbeil et al. for the above-described limitations. In particular, as shown in FIG. 1 of Klingbeil et al., the scanner is comprised of faceted mirror 5 and mirror 8. The output from the beam scanner is reflected by mirror 9 onto mirror 10 where it is directed towards eye 12. There is nothing in this which provides a collimated beam output from a lens means. The only element shown in Klingbeil et al. that may act as a lens is mirror 10. However, as the Examiner can clearly appreciate, the output from mirror 10 is not collimated. Further, mirror 9 merely serves to redirect the beam output from the scanner and the output from mirror 9 is not collimated. Still further, as shown in FIG. 1, Klingbeil et al. does not teach the use of a means for focusing the radiation after it is transferred by the lens means, which means for focusing is required by all of the present claims. This is because, as shown by the arrangement in FIG. 1 of Klingbeil et al., mirror 10 is the only element that performs focusing since mirror 9 merely serves to redirect the beam.

As such, Applicants respectfully submit that present claims 1-3, 5, 7 and 16-17 are not anticipated by Klingbeil et al. Thus, Applicants respectfully request the Examiner to withdraw this rejection.

Examiner rejected claims 12-14 under 35 U.S.C. § 103. Specifically, the Examiner stated:

Claims 12-14 are rejected under 35 U.S.C. § 103 as being unpatentable over Klingbeil et al. Klingbeil et al. discloses the claimed invention except for the fixation means. Since it is notoriously well known in the art to incorporate a fixation means in an ophthalmic device, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the apparatus of Klingbeil et al. with a fixation means in order to provide an image for the patient to focus on during the scanning process.

Applicants have amended claims 12-14 and added new claim 18 to more clearly define the present invention. As such, Applicants respectfully traverse the rejection.

Applicants respectfully submit that present claims 12 and 14 depend from present claim 5 and present claims 13 and 18 depend from present claim 2, and that present claims 2 and 5 are patentable over Klingbeil et al. for the reasons set forth above. Specifically, Klingbeil et al. provides no teaching or suggestion for providing a lens means which is fixed with respect to a point of final deflection of a beam scanner to provide a collimated beam of radiation. Further, Applicants respectfully submit that there is no teaching or suggestion in Klingbeil et al. for utilizing a fixation means. Further, even if it were known in the art to utilize a fixation means, there is nothing in the present record which suggests the use of a fixation means as required by present claims 12-14 and 18.

As such, Applicants respectfully submit that present claims 12-14 and 18 are patentable over Klingbeil et al. Thus, Applicants respectfully request the Examiner to withdraw this rejection.

Examiner rejected claims 4 and 8-9 under 35 U.S.C. § 103. Specifically, the Examiner stated:

Claims 4 and 8-9 are rejected under 35 U.S.C. § 103 as being unpatentable over Klingbeil et al. in view of Kobayashi

(4,900,144). Klingbeil et al. discloses the claimed invention except for the compensator and light stop means. Kobayashi teaches it was known to use a compensator in fundus illuminating apparatus (see 26 of figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the light blocking means of Kobayashi in the apparatus of Klingbeil et al. in order to prevent the center of the ocular lens from illuminating.

Regarding the compensating means, Kobayashi teaches it was known to use a compensator in a fundus illuminating apparatus. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the compensator of Kobayashi in the apparatus of Klingbeil et al. in order to compensate for the phase shift in the light because of the beamsplitter.

Applicants have amended claims 4 and 8-9 to more clearly define the present invention. As such, Applicants respectfully traverse the rejection.

Applicants respectfully submit that present claim 4 depends from present claim 3 and that present claim 3 is patentable over Klingbeil et al. for the reasons set forth above. Specifically, Klingbeil et al. provides no teaching or suggestion for providing a lens means which is fixed with respect to a point of final deflection of a beam scanner to provide a collimated beam of radiation. Applicants respectfully submit that they have not been able to find the teaching in Kobayashi relating to a compensator asserted by the Examiner. In particular, at col. 5, lines 19-21 Kobayashi refers as follows to element 26: "Also, between the lens 20 and the half mirror 21 is a black spot 26 for eliminating the effect of light reflecting from the surface of the objective lens 19." Further, the Examiner asserted that one of ordinary skill in the art would have used "the compensator of Kobayashi in the apparatus of Klingbeil et al. in order to compensate for the phase shift in the light because of the beamsplitter." However, this is not the reason for using the compensator as required by present claim 4. This is stated as follows in the specification, at p. 11, lines 11-27:

FIG. 4 shows, in pictorial form, a portion of the beamsplitter apparatus utilized in fabricating an embodiment of the present invention. Introduction of beamsplitter 220 into fundus camera 4000 causes a parallel shift of the optical axis of fundus camera 4000. In a fundus camera, the illumination optics is designed so that the vertex of ocular lens 100 is not illuminated. This is done to avoid reflections from ocular lens 100 back into the observation path. With the use of beamsplitter 220, the

illumination cone is shifted and light beams may hit the vertex of ocular lens 100 and, thereby, cause false light to be reflected into the observation path. As shown in FIG. 4, this is avoided by the use of compensation plate 230. The thickness and tilt angle of compensation plate 230 are determined in accordance with methods which are well known to those skilled in the art to compensate for the shift of the optical axis introduced by beamsplitter 220. Also, compensation plate 230 eliminates coma caused by tilted beamsplitter plate 220.

Applicants respectfully submit that present claim 8 depends from present claim 5 and that present claim 9 depends from present claim 2 and that present claims 2 and 5 are patentable over Klingbeil et al. for the reasons set forth above. Specifically, Klingbeil et al. provides no teaching or suggestion for providing a lens means which is fixed with respect to a point of final deflection of a beam scanner to provide a collimated beam of radiation. Further, even though Kobayashi shows the use of black spot 26 for eliminating the effect of light reflecting from the surface of a lens, Applicants respectfully submit that this is completely different from the light stop of present claims 8-9. In particular, Kobayashi teaches placement of black spot 26 to eliminate light after it is reflected from objective lens 19 whereas, in accordance with present claims 8 and 9, a light stop is placed in an illumination path to provide a hollow cone of light before the light can reflect from a lens. Thus, Applicants respectfully submit that Kobayashi provides no teaching or suggestion for utilizing a light stop in the manner required by present claims 8-9.

As such, Applicants respectfully submit that present claims 4 and 8-9 are patentable over Klingbeil et al. in view of Kobayashi. Thus, Applicants respectfully request the Examiner to withdraw this rejection.

Examiner stated:

Claims 10 and 11 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112 and to include all of the limitations of the base claim and any intervening claims.

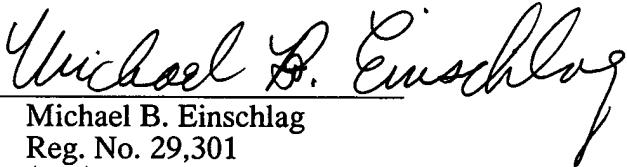
Claim 15 is allowable over the prior art of record.

The following is an Examiner's statement of reasons for the indication of allowable subject matter: regarding claim 15 the prior art of record teaches the claimed invention except for the reference beam and sample beam impinging direction being disposed at an angle of 45 degrees.

Applicants have amended claim 10 and 11. As such, and in light of the responses set forth above, Applicants respectfully submit that present claims 10-11 are also allowable.

Applicants respectfully submit that all the remaining claims are allowable and Applicants respectfully request that the Examiner reconsider the case and pass the case to issue. Should the Examiner have any questions or wish to discuss any aspect of the application, a telephone call to the undersigned would be welcome.

Respectfully submitted,

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